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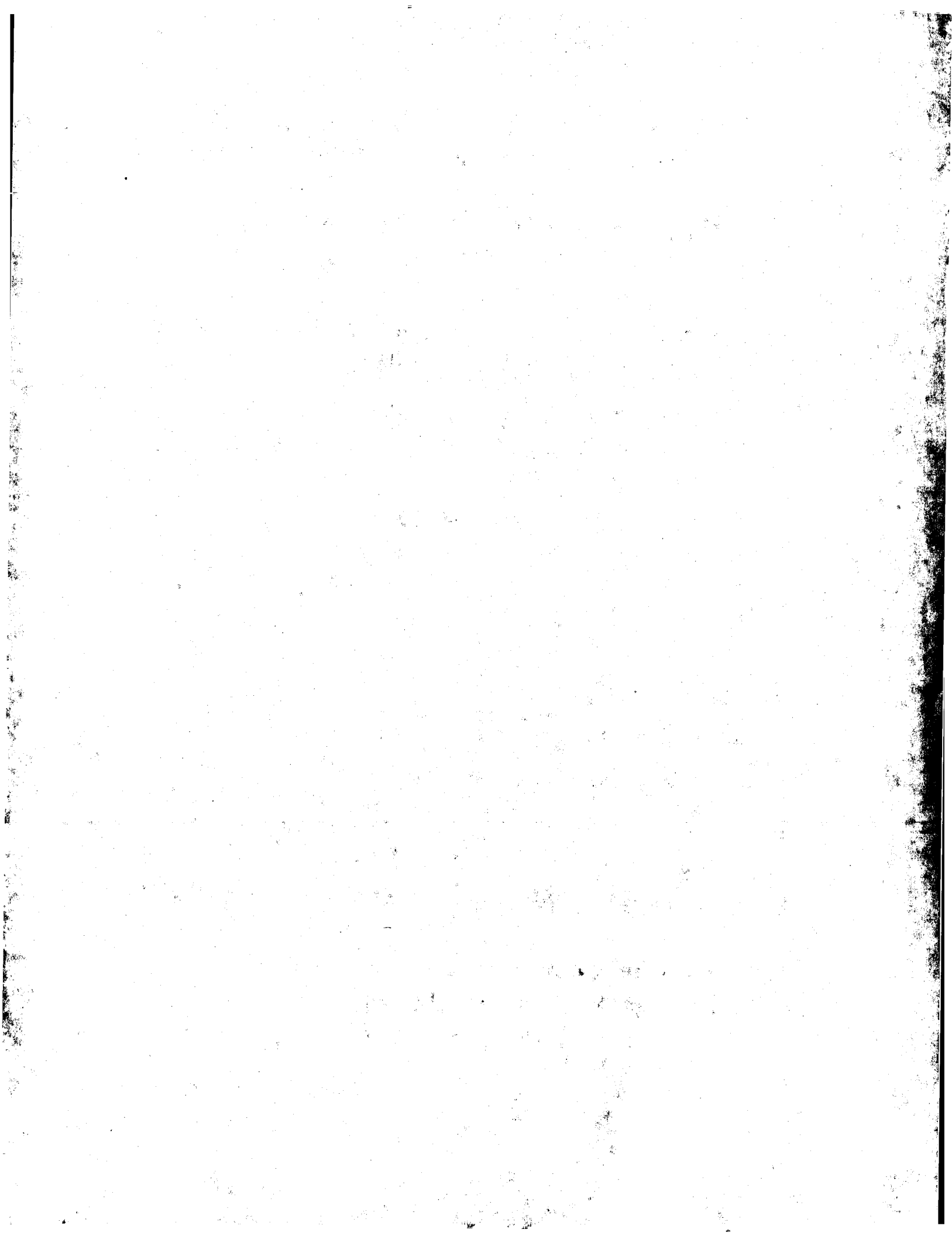
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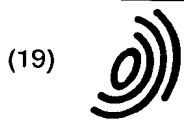
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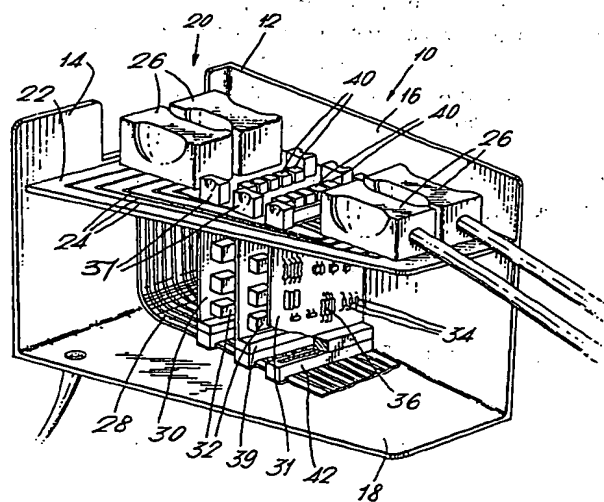
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(54) Electrical distribution system

(57) An electrical distribution system for a motor vehicle comprising a power and signal distribution board (22) having electrical connection means (26) for connection to a power supply, to one or more electrical loads; and for signal distribution; signal distribution means (28) for receiving and transmitting electrical signals; at least one control board (30,31) extending between, and electrically connectable with, the power and signal distribution board and the signal distribution means, and having electrically operable switch means (32) mounted thereon for switching the power supply between the electrical connection means on the power and signal distribution board, and having electronic control means (34,36) mounted thereon for controlling the operation of the switch means dependent on signals received on the signal distribution means; and a casing (12) within which the power and signal distribution board, the signal distribution means, and the control board are mounted. Provides a modular arrangement for power and signal distribution.

Fig.1.



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Description

trical distribution system of Figure 1.

Technical Field

[0001] The present invention relates to an electrical distribution system for a motor vehicle which is used for the distribution of both electrical power and electrical signals.

Background of the Invention

[0002] Currently, in motor vehicles, electrical power distribution and electrical signal distribution are in general isolated from one another, and/or are provided by numerous separate systems. This leads to complicated wiring harness designs, difficulties in installation in the motor vehicle, and a multitude of system casings and set-ups.

Summary of the Invention

[0003] It is an object of the present invention to simplify the electrical distribution within a motor vehicle.

[0004] An electrical distribution system for a motor vehicle in accordance with the present invention comprises a power and signal distribution board having electrical connection means for connection to a power supply, to one or more electrical loads, and for signal distribution; signal distribution means for receiving and transmitting electrical signals; at least one control board extending between, and electrically connectable with, the power and signal distribution board and the signal distribution means, and having electrically operable switch means mounted thereon for switching the power supply between the electrical connection means on the power and signal distribution board, and having electronic control means mounted thereon for controlling the operation of the switch means dependent on signals received on the signal distribution means; and a casing within which the power and signal distribution board, the signal distribution means, and the control board are mounted.

[0005] The present invention provides a modular arrangement for power and signal distribution which reduces wiring harness complexity, provides easier installation in a motor vehicle, and enables a reduction in the number of variants.

Brief Description of the Drawings

[0006] The present invention will now be described, by way of example, with reference to the accompanying drawing, in which:-

Figure 1 is a side view of an electrical distribution system in accordance with the present invention; and

Figure 2 is an enlarged side view of part of the elec-

Description of the Preferred Embodiment

[0007] Referring to the Figures, the electrical distribution system 10 for use in a motor vehicle comprises a casing 12 of electrically insulating material having an end wall 14; a side wall 16; a base wall 18; and an open end 20 opposite the base wall. The open portions of the casing 12 may be closed in any suitable manner, and other arrangements for the casing may be used.

[0008] A power and signal distribution board 22 is mounted in the casing 12 adjacent the open end 20 thereof, and in a plane substantially parallel to the base wall 18. The board 22 is preferably in the form of a substantially rigid printed circuit board with electrically conductive lines 24 thereon for the distribution of electrical power and electrical signals. Electrical connectors 26 are mounted on the board 22 at each end, or at any other suitable location, and make electrical connection with the lines 24 for the input and output of both electrical power and electrical signals to and from the system 10.

[0009] A ribbon cable 28 extends from the board 22 adjacent the end wall 14 and then across the base wall 18. The ribbon cable is electrically connected to the board 22 adjacent the end wall 14 of the casing 12. The ribbon cable 28 also provides for electrical signal distribution in the system 10. As an alternative, the ribbon cable may be replaced by a flexible printed circuit, a flexible flat circuit, or a moulded interconnection device.

[0010] A number of control boards 30,31 extend between the board 22 and the ribbon cable 28. The control boards 30,31 are preferably slidably mounted in grooves (not shown) formed on the side wall 16 of the casing 12, and in a plane substantially perpendicular to the board 22. The control boards 30,31 are preferably substantially rigid printed circuit boards with electrically conductive lines (not shown) formed thereon. One or more of the control boards 30 has one or more relays 32 mounted thereon which are electrically connected with the electrically conductive lines formed on the control board. One or more of the control boards 31 has electronic components 34 mounted thereon, and may also include one or more microcomputers 36 mounted thereon which are electrically connected with the electrically conductive lines formed on the control board. At one end 37, each control board 30,31 extends through a corresponding aperture 38 in the board 22. Electrical connections are made between the lines 24 on the board 22 and the lines on the control boards 30,31 by way of electrical fuses or circuit breakers 40, or by a straight connection. At the other end 39, each control board 30,31 makes an electrical connection with the ribbon cable 28 by way of an electrical connector 42. The electrical connectors 42 are preferably either known card insert connectors or known insulation piercing connectors.

[0011] With the present invention, power distribution and signal distribution for a motor vehicle can be combined within a casing which can be assembled before installation on a motor vehicle. Power distribution from a vehicle battery (not shown) to the electrical loads (not shown) in a vehicle is by way of the board 22, the fuses/circuit breakers 40 and the relays 32. The microcomputers 36 and electronic components 34 receive and send signals by way the board 22 and the ribbon cable 28 to monitor and control the operation of the relays 32, and to monitor and control the operation of other electrical components in the motor vehicle. The present invention therefore provides a modular arrangement for combining power and signal distribution. Such an arrangement reduces the complexity of vehicle wiring harnesses and provides for easier installation in a motor vehicle.

[0012] The relays 32 may be replaced by any other suitable electrically controllable switching device, such as MOSFETs. The fuses/circuit breakers 40 may be replaced by any other suitable overload protection devices. The microcomputers 36 may be replaced by any other suitable form of logic control means or semiconductor control device. The electrical connectors 26 may be replaced by any other suitable form of electrical connection means.

[0013] The present invention also lends itself for easy modification dependent on the vehicle within which the system is to be installed, and dependent on customer requirements for the vehicle, thereby reducing variants.

Claims

1. An electrical distribution system for a motor vehicle comprising a power and signal distribution board having electrical connection means for connection to a power supply, to one or more electrical loads, and for signal distribution; signal distribution means for receiving and transmitting electrical signals; at least one control board extending between, and electrically connectable with, the power and signal distribution board and the signal distribution means, and having electrically operable switch means mounted thereon for switching the power supply between the electrical connection means on the power and signal distribution board, and having electronic control means mounted thereon for controlling the operation of the switch means dependent on signals received on the signal distribution means; and a casing within which the power and signal distribution board, the signal distribution means, and the control board are mounted.
2. An electrical distribution system as claimed in Claim 1, comprising at least first and second control boards, the first control board having the electrically operable switch means mounted thereon, and the second control board having the electronic control

means mounted thereon.

3. An electrical distribution system as claimed in Claim 1 or Claim 2, wherein electrical fuses or circuit breakers provide the electrical connection between the or each control board and the power and signal distribution board.
4. An electrical distribution system as claimed in Claim 2 or Claim 3, wherein the or each control board extends through a corresponding aperture in the power and signal distribution board at one end of the control board, the fuses or circuit breakers being positioned at said one end.
5. An electrical distribution system as claimed in any one of Claims 1 to 4, wherein the signal distribution means is a ribbon cable.
6. An electrical distribution system as claimed in any one of Claims 1 to 5, wherein the power and signal distribution board and/or the control boards are substantially rigid printed circuit boards having electrically conductive lines formed thereon.

Fig.1.

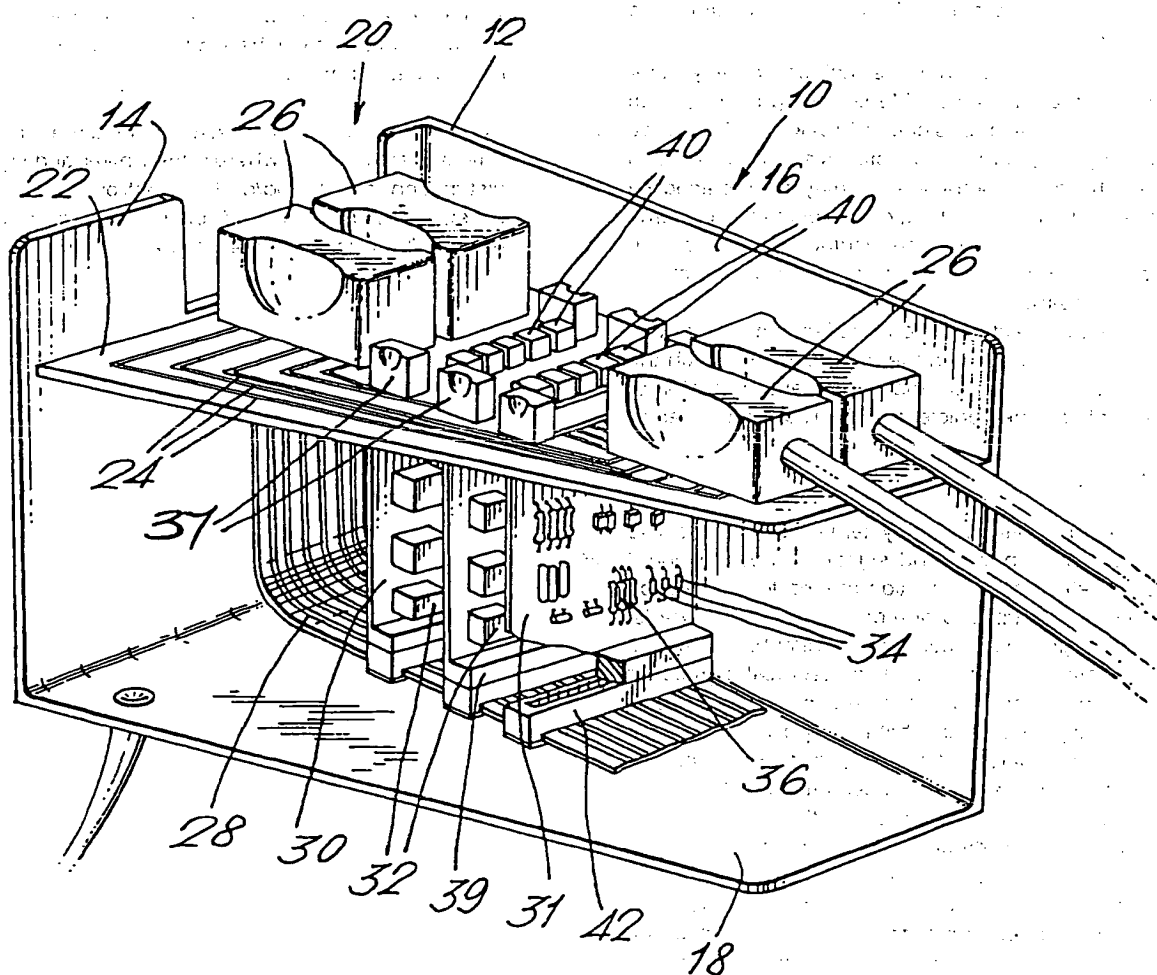
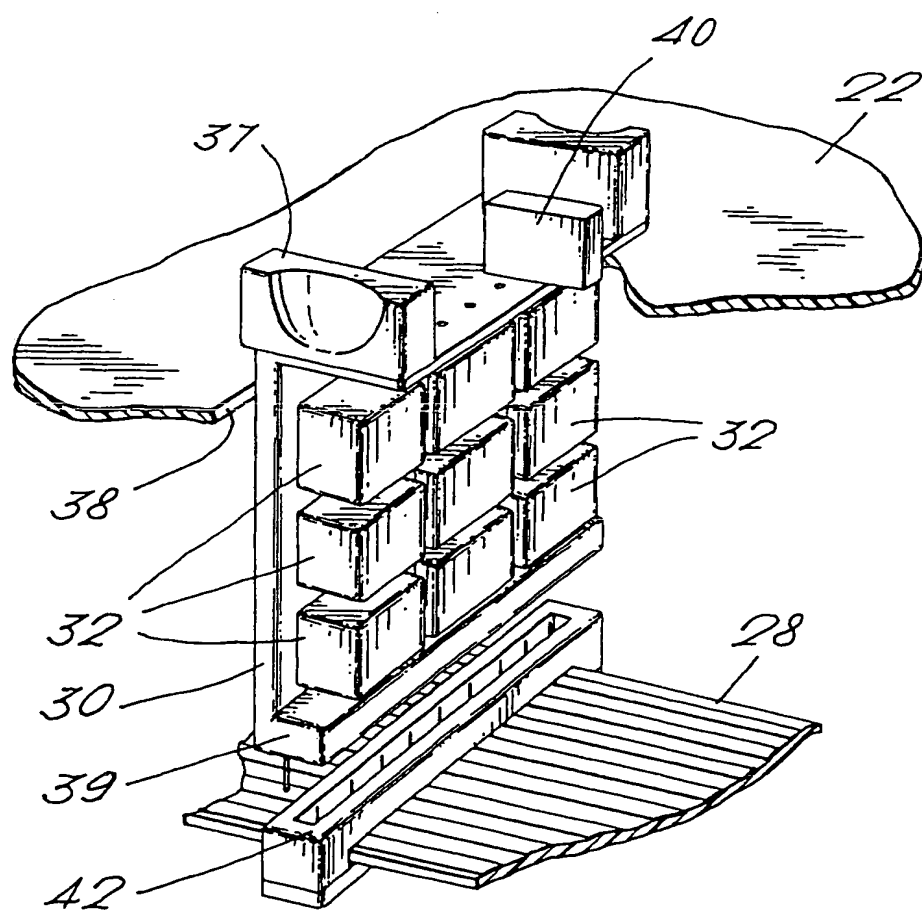
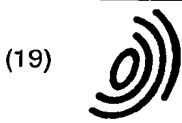


Fig.2.



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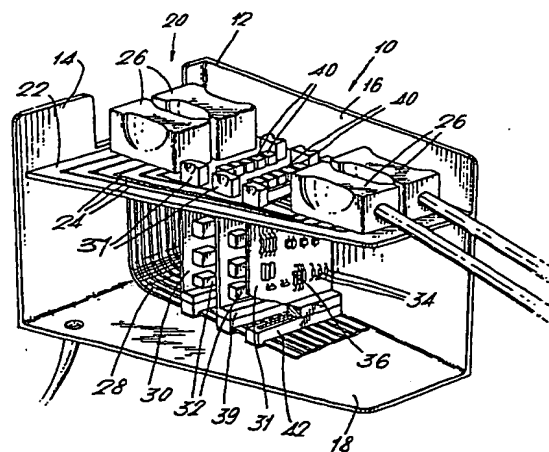
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Fig.1.



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EUROPEAN SEARCH REPORT

Application Number
EP 98 20 2670

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 4 906 195 A (KUBOTA MITSUJI ET AL) 6 March 1990 (1990-03-06)		B60R16/02 H02J1/14
A	US 4 534 025 A (FLOYD WILLIAM M) 6 August 1985 (1985-08-06)		
A	EP 0 734 905 A (FRAMATOME CONNECTORS INT) 2 October 1996 (1996-10-02)		
A	US 5 428 535 A (KATSUMATA IKUO ET AL) 27 June 1995 (1995-06-27)		
A	US 5 424 586 A (HATTORI YUKIMITSU ET AL) 13 June 1995 (1995-06-13)		
A	US 4 028 738 A (ROUVRE PHILIPPE ET AL) 7 June 1977 (1977-06-07)		
A	WO 95 30263 A (ELECTRO WIRE PRODUCTS INC) 9 November 1995 (1995-11-09)		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B60R
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22 December 1999	Examiner Lampe, S
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ON EUROPEAN PATENT APPLICATION NO.**

EP 98 20 2670

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4906195 A	06-03-1990	CA 1295407 A	04-02-1992
US 4534025 A	06-08-1985	CA 1210169 A	19-08-1986
		DE 3475176 A	22-12-1988
		EP 0117832 A	05-09-1984
		ES 529979 A	01-10-1985
		ES 540035 A	01-04-1986
		JP 1812135 C	27-12-1993
		JP 5014960 B	26-02-1993
		JP 59163697 A	14-09-1984
EP 0734905 A	02-10-1996	DE 19511755 C	22-08-1996
		US 5793615 A	11-08-1998
US 5428535 A	27-06-1995	JP 6097683 A	08-04-1994
		JP 6097684 A	08-04-1994
		JP 6153270 A	31-05-1994
US 5424586 A	13-06-1995	JP 4280524 A	06-10-1992
		DE 69219189 D	28-05-1997
		DE 69219189 T	30-10-1997
		EP 0504549 A	23-09-1992
US 4028738 A	07-06-1977	FR 2184193 A	21-12-1973
		DE 2323620 A	06-12-1973
		GB 1419998 A	07-01-1976
		IT 987275 B	20-02-1975
WO 9530263 A	09-11-1995	CA 2189451 A	09-11-1995
		EP 0759219 A	26-02-1997
		JP 10502239 T	24-02-1998

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